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(54) SECTIONAL DOORS AND FLEXIBLE HINGE ASSEMBLIES.

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Description

Field of the Invention

The present invention relates to sectional doors and flexible hinge assemblies therefor wherein the abutting panel sections of the doors are hingedly secured for articulation with respect to each other by the flexible hinge assemblies.

Background

Generally, door panel sections for upward acting doors are connected together by spaced hinges which typically are comprised of pairs of metal plates having interengaging hinge pins. The metal plates are usually arranged so that each metal plate of a pair is fastened to abutting panel sections. While some of the adjoining panel sections are arranged to have interlocking abutting edges, these have not always proven to be weather tight. Furthermore, metal hinges are subject to corrosion and rusting. To prevent such rusting and provide for easier operation, it is advisable to oil the hinge pins from time to time. Not only is this messy but requires an adequate maintenance schedule to keep rust from forming. Moreover, the use of metal hinges results in an inferior appearance on the inside or rear face of such upward acting doors due to the objectionable appearance of the metal hinges located thereon.

Consequently, there is a need for hinge arrangements that can eliminate the objectionable maintenance and unsightly appearances associated with metal hinges, yet which can operate as effectively as metal hinges to hingedly secure together abutting panel sections of upward acting doors.

Swiss Patent No 482898 describes a plastic hinge assembly comprising a U-shaped base, the thickness of the web of which being much less than that of the flanges thereof. An integrally formed arm extends from each flange, the arms being at 90° to each other. The hinge assembly is employed to connect a side and the base of a receptacle, each of which is formed with an appropriately configured slot for receiving one half of the assembly therein. The hinge assembly flexes around the thin web of the U-shaped base thereof.

Summary of the Invention

The present invention seeks to alleviate one or more of the above-mentioned problems and disadvantages associated with metal hinges through the use of a flexible hinge assembly for hingedly securing together abutting panel sections of upward acting doors which are generally used to close garages, service entrances for commercial

buildings loading dock areas, truck bodies and the like.

A flexible hinge assembly for securing together abutting panel sections of a sectional door for articulation of the panel sections with respect to each other in accordance with the invention comprises a hinge having first and second arm flanges, each being connected to an elongated central web and spaced from the other, one arm flange being insertable into an elongated slot provided in a panel section and the other arm flange being insertable into another elongated slot in another abutting panel section for hingedly connecting the panel sections in an abutting relationship, the elongated central web having an exterior side with an elongated area along the middle thereof for flexing thereat characterised in that the hinge assembly serves to secure together two panel sections of a sectional door for articulation of the panel sections with respect to each other, in that the elongated central web has a pair of spaced elongated longitudinal grooves extending along the exterior side surface respect to each other and in that the hinge assembly further comprises two elongated retainer slats each having first and second elongated edges, the first elongated edges being adapted to be inserted into an elongated slot of an abutting panel section in contact with the flange of the hinge inserted therein and the second elongated edges being received by the longitudinal grooves along the exterior side of the hinge central web for locking the elongated flexible hinge in the elongated slots of the abutting panel sections.

Each flexible hinge assembly is designed to cooperate with mating elongated, longitudinal slots provided in two abutting panel sections of upwardly acting doors to hingedly secure the panel sections together for articulation with respect to each other. The configuration of the flexible hinge assemblies are such that they can be easily snapped into place in the elongated mating slots of the abutting panel sections from the rear faces of the panel sections rather than having to slide the flexible hinge assemblies in from the ends of the panel sections. Moreover, installation of the flexible hinge assemblies can be accomplished without having to resort to tools thereby significantly shortening the time required to assemble the upward acting doors.

More particularly, the flexible hinge assemblies comprise an elongated flexible hinge and two elongated retainer slat components. The flexible hinge comprises first and second arm flanges connected to a central web formed of a material which is preferably substantially resistant to flexure fatigue wherein each arm is inserted into one respective mating elongated slot in one abutting panel section of an upward acting door. Each retainer slat component is then snapped into one respective mating

elongated slot in contact with one arm to lock the hinge in place so that the abutting panel sections are hingedly secured together by the flexible hinge and retainer slat components for articulation with respect to each other.

In a further feature, the hinge assemblies provide a continuous weather strip seal between abutting panel sections which act to seal off any air and adverse weather infiltration. In addition, the design of the flexible hinge assemblies eliminates the need for a vertical space between abutting panel sections for pivot purposes as required with conventional garage door hardware. In still another feature, the flexible hinge assemblies experience substantial longevity due to the fact that the total rotation between abutting panel sections of an upward acting door is typically no more than about 80-90°.

In yet a further feature, the flexible hinge assemblies eliminate undesirable pinch points on the rear side or faces between abutting panel sections, especially when the abutting panel sections are in different planes during the opening and closing process of the upward acting doors. Moreover, they provide a superior appearance on the inside or rear faces of assembled upward acting doors by eliminating the unsightly hinge hardware, straps and/or bolts commonly associated with metal hinges. In addition, as a result of their design, the flexible hinge assemblies reduce the level of noise normally associated with the operation of upwardly acting doors and provide stronger hinges for such door since the load of each panel is distributed uniformly along the entire length of the novel hinge assemblies, which typically is equal to the length of the panels. The flexible hinge assemblies can be designed to be thermally self-adjusting so that the changes in the curvature of the upward acting doors, caused by heat or cold, can be adjusted to permit the plastic hinge assemblies to continue to effectively operate.

The above and other features and advantages of the present invention, including various novel details of design will now be more particularly described by way of example with reference to the figures and detailed description and pointed out in the claims.

Description of the Figures

Reference is now made to the accompanying figures in which are shown illustrative embodiments of the present invention from which its novel features and advantages will be apparent.

FIG. 1 is a cross-sectional view of a portion of an upward acting door taken along lines 1-1 of Fig. 4;

FIG. 2 is a cross-sectional view similar to that of Fig. 1 but with door sections of an upward acting door displaced relative to each other as the door is raised or lowered along its tract;

FIG. 3 is a cross-sectional view similar to that of Fig. 2 of an upward acting door along lines 1-1 of FIG. 4, but displaying an alternative plastic hinge assembly;

FIG. 4 is a perspective view of an overall installation of an upward acting door of the present invention; and

FIG. 5 is a cross-sectional exploded view of a portion of an unassembled upward acting door and plastic hinge assembly along lines 1-1 of FIG. 4.

Detailed Description of the Invention

By way of illustrating and providing a better appreciation of the present invention and attendant advantages thereof, the following detailed description is given concerning the upward acting doors and flexible hinge assemblies.

Referring now to FIG. 4 of the figures, an upward acting door 10 is mounted to close an opening formed between door jams 13 and 14. Door 10 is arranged to ride in tracts 15 and 16 by means of rollers 18 and 19. Tracts 15 and 16 are secured for a portion of their lengths to jams 13 and 14 and then, after forming a turn, are supported near their free ends by supporting brackets 21 and 22, respectively.

A torsion spring and/or extension spring 25 is positioned to cooperatively engage cables 27 and 28 attached to the bottom edge (not shown) of door 10 to assist in raising the door in the usual manner. Door 10 is made up of a series of panel sections, of which only two, 30 and 50, are shown.

The description, thus far, concerns a conventional upward acting door, door mechanism and components as generally known to those versed in the art. These mechanisms and components are exemplary and operate in the well known manner to raise and lower the door 10.

Reference may now be had to FIGS. 1, 2 and 5 for a more detailed consideration of a novel flexible hinge assembly 70 of the instant invention and its manner of connection with abutting or adjoining panel sections of an upward acting door.

FIGS. 1, 2 and 5 show abutting edges of elongated panel sections 30 and 50 with flexible hinge 70, in engagement therewith, of a portion of a door in a closed or lowered position, an articulated position, or a closed or lowered and unassembled position, respectively. The lower elongated panel section 50 comprises a generally U-shaped structure 60 of, for example, extruded aluminum, steel, or other metal, plastic or the like with a base 51

and two upstanding, parallel front and back flanges 52 and 53, respectively, in spaced relationship. As part of base 51, a notch 54 is formed.

Front flange 52 preferably is connected integrally and longitudinally along the front edge of base 51. Back flange 53 is preferably connected integrally and longitudinally along the upper edge of an elongated, longitudinal slot 55 and at the back or inside edge of base 51, as shown in FIG. 5. Elongated slot 55 is further provided and in communication with an elongated, longitudinal recess 56. Both slot 55 and recess 56 are formed by back flange 53.

In addition, back flange 53 forms an elongated, longitudinal groove 57 in communication with elongated slot 55. At the non-communicating end of elongated, longitudinal groove 57 is an elongated, longitudinal recess 58. Slot 55 is partially closed by an elongated short flange 59 extending longitudinally along back flange 53 and upwardly but short of the underside base 51, leaving a gap for the insertion of flexible hinge 70 into elongated slot 55 and recess 56. Together, slot 55, recess 56, groove 57, recess 58 and short flange 59, all of which are formed by back flange 53, form an overall elongated, longitudinal slot 61 of generally V-shaped cross-section which extends longitudinally along back flange 53 near the back or inside edge of base 51.

Filled within the U-shaped structure 60 of lower panel section 50 between base 51 and front and back flanges 52 and 53, respectively, is a light weight, preferably insulative foam 62 comprised of, for instance a polyurethane or the like. As an alternative, an expanded polystyrene bead board or rigid foam may be used. Of course, it should be understood that panel sections which are not filled with a foam can also be employed with this invention. An elongated, longitudinal downwardly and inwardly projecting rib 63 from base 51 aids in holding the U-shaped structure 60 to foam 62.

Since the upper panel section 30 is substantially complimentary to that of lower panel section 50, the corresponding members have been designated with corresponding numbers in the 30s and 40s, respectively, and having the suffix (a) appended thereafter. The main difference between upper and lower panel sections 30 and 50, respectively, lies in the formation of the base wherein the upper base 51 of lower panel section 50 is shaped with an elongated, longitudinal notch 54 whereas the lower base 31a of upper panel section 30 is shaped with an elongated, longitudinal slot 34a which mates with longitudinal notch 54 when upper and lower panel sections 30 and 50, respectively, are in an abutting or adjoining relationship.

Turning now to a more detailed discussion of FIG. 2, it shows that panel sections 30 and 50 of

FIG. 1 are hingedly secured to each other in an operative condition when the door is being opened or closed and panel sections 30 and 50 are in different planes as they ride over the bend in tracts 15 and 16. It can easily be seen that elongated flexible hinge 70 flexes longitudinally along a central recessed axis. The recessed area 71 is provided by a thin section in central web 72 of hinge 70. Elongated central web 72 is located between major arm flanges 73 and 74. Elongated arm flanges 73 and 74 extend at a generally acute to linear angle away from main centrally, longitudinally recessed web 72. Longitudinal anchoring flanges 75 and 76 are connected to the free ends of longitudinal arm flanges 73 and 74, respectively, and extend at a generally perpendicular angle away from central web 72. Flexible hinge 70 is provided with interior and exterior sides 77 and 78. Central web 72 is provided with a pair of elongated, longitudinal grooves 79 and 80 extending along the exterior surface 78 of central web 72 and spaced from each other. It should be understood, however, that when flexible hinge 70 is in an unassembled extruded form, it may be linear shape or V-shape cross section as illustrated in Fig. 5. The V-shape cross section as shown in Fig. 5 is in phantom.

Once inserted into overall elongated slots 61 and 41a of abutting panels, flexible hinge 70 is generally of V-shape cross-section with the anchoring flanges 75 and 76 being integrally connected to the free edges of longitudinal arm flanges 73 and 74 on the interior side of flexible hinge 70; the interior anchoring flanges 75 and 76 being positioned generally perpendicular to the spaced longitudinal arm flanges 73 and 74. The interior sides of arm flanges 73 and 74 and anchoring flanges 75 and 76 are shaped so as to engage the interior surfaces of back flanges 53 and 33a and longitudinal recesses 56 and 36a of lower and upper panels 50 and 30, respectively, as depicted in FIG. 5. The anchoring flanges 75 and 76 form short stubs for anchoring flexible hinge 70 within the overall elongated, longitudinal slots 61 and 41a of lower and upper panel sections 50 and 30, respectively.

Once flexible hinge 70 has been inserted into the V-shape cross-section overall elongated slots 41a and 61 in upper and lower panel sections 30 and 50, respectively, by the insertion of longitudinal arm flanges 73 and 74 into mating slots 35a and 55 and longitudinal recesses 36a and 56, respectively, longitudinal retainer slats 90 are snapped into upper and lower panel sections 30 and 50, respectively, in contact with arm flanges 73 and 74 to lock flexible hinge 70 in place. Elongated, longitudinal retainer slats 90 are generally comprised of V-shape cross-section structures designed to mate with short flanges 39a or 59, the exterior sides 78 of longitudinal arm flanges 73 and 74 of flexible

hinge 70 and the longitudinal grooves 37a or 57 of lower and upper panel sections 30 or 50, respectively.

More particularly, elongated, longitudinal retainer slats 90 comprise a first longitudinal arm 91 for inserting into mating slots 55 or 35(a) to be wedged between the exterior sides 78 of longitudinal arm flanges 73 or 74 of flexible hinge 70 and short flanges 59 or 39a of back flanges 53 or 33a, respectively, and a second longitudinal arm 92 for inserting into mating longitudinal grooves 37a or 57. At the end of second arm 92 is a longitudinal notch 93 for mating with longitudinal recesses 38a or 58 of upper and lower panel sections 30 or 50, respectively. Preferably, longitudinal grooves 37a and 57 and longitudinal recesses 38a and 58 of upper or lower panel sections 30 or 50, respectively, are of a design so that they correspond with second longitudinal arms 92 and notches 93 to such an extent that the back sides 45a or 65 of panel sections 30 or 50, respectively, when in an abutting relationship, are substantially smooth and flush with flexible hinge 70 and retainer slats 90.

As an alternative to the V-shape elongated, longitudinal retainer slats 90, it is contemplated within the scope of this invention that elongated, longitudinal retainer slats 95 as illustrated in FIG. 3 may also be used. As shown therein, elongated retainer slats 95 are designed with only first and second longitudinal edges 96 and 97 that can be used to lock flexible hinge 70 in place. Like retainer slats 90, alternative retainer slats 95 are wedged between the exterior sides 78 of longitudinal arm flanges 73 or 74 of flexible hinge 70 and short flanges 59 or 39a of back flanges 53 or 33a, respectively. Unlike retainer slats 90, however, when alternative retainer slats 95 are employed, the back sides 45a and 65 of panel sections 30 and 50, respectively, when in an abutting relationship, are not continuously smooth with flexible hinge 70 and retainer slats 95. Moreover, alternative retainer slats 95 are designed with somewhat of an arcuate shape for easy installation as shown in FIG. 3.

The material of which flexible hinge 70 and retainer slats 90 or 95 are formed can be of any suitable light weight material. Of course, central web 72 and in particular the recessed area 71 of central web 72 is formed of a material which is resistant to fatigue upon flexion, and preferably increases in strength upon flexion. For example, any high molecular weight polymer, such as polypropylene or a polyallomer plastic or the like may be employed. The name polyallomer is applied to block copolymers which have a highly ordered crystalline structure of polypropylene and ethylene. Moreover, flexible hinge 70 and retainer slats 90 and 95 can be produced by, for instance, standard

extrusion or coextrusion technology which, of course, is well known to those versed in the extrusion art.

Exemplary of typical commercial polymers that may be used to produce flexible hinge 70 when it is extruded include a polypropylene sold by Fina Oil & Chemical under product number #3622 or a polyallomer sold by Eastman Kodak under the trademark Tenite and product number 5021. When hinge 70 is coextruded, central web 72 and in particular recessed area 71 is preferably formed with an elastomer material whereas arm flanges 73, 74 may be formed with a rigid polymer. Examples of elastomers that may be used include a polyester elastomer sold by DuPont under the trademark Hytrel, a fluoroelastomer also sold by DuPont under the trademark Viton and a thermoplastic rubber elastomer marketed by Shell Chemical under the trademark Kraton. The rigid polymers that may be used in the coextrusion process to form arm flanges 73, 74, include a polyvinyl chloride (PVC) sold by Goodyear under the trademark Geon and product number 83 or an acrylonitrile-butadiene-styrene (ABS) marketed by Dow Chemical under the trademark Magnum and product number 350. These, as well as other suitable rigid polymers may also be used to form slats 90 and 95. In addition, polymers such as a polypropylene sold by Fina Oil & Chemical under product number 3622 or a polycarbonate marketed by Maobay under the trademark Makrolon under product number 3200 may be used for slats 90 and 95.

As previously referred to hereinabove, one of the advantages associated with the flexible hinge assemblies is that they can be designed to thermally self-adjust, so that changes in the curvature of the door, caused by heat, cold or wind, can be adjusted to permit the panel sections hingedly connected by the novel flexible hinge assemblies to still operate. This is accomplished by virtue of the fact that the flexible hinge component is not affixed to either abutting panel section thereby permitting the flexible hinge to adjust to any curvatures imparted to the door resulting from, for example, thermal bowing or wind load.

In summary, a novel flexible hinge arrangement is provided to form a weather-tight seal between sectional panels of an upward acting door having a long effective life. The flexible hinge assemblies and their retainer slats can be inserted from the back sides or faces 45a and 65 of panel sections 30a and 50, respectively, rather than from their ends. Thus, the unique design of flexible hinge 70 and retainer slats 90 or 95 permits installation to be done without tools and shortens the time required to assemble the door 10. As can now be appreciated, the novel flexible hinge assemblies result in a superior appearance on the back sides or sur-

faces 45a and 65 of the garage door since there are no unsightly metal hinges, straps and bolts. The novel flexible hinge arrangements also eliminate interior pinch points between panel sections 30a and 50 when they are in different planes as they ride over the bend in tracts 15 and 16.

Claims

1. Flexible hinge assembly (70, 90, 95) for securing together two abutting panel sections (30, 50) comprising a hinge (70) having first and second arm flanges (73, 74), each being connected to an elongated central web (72) and spaced from the other, one arm flange (73) being insertable into an elongated slot (35a, 55) provided in a panel section (30) and the other arm flange (74) being insertable into another elongated slot (36a, 56) in another abutting panel section (50) for hingedly connecting the panel sections (30, 50) in an abutting relationship, the elongated central web (72) having an exterior side (78) with an elongated area (71) along the middle thereof for flexing thereat characterised in that the hinge assembly (70, 90, 95) serves to secure together two panel sections (30, 50) of a sectional door (10) for articulation of the panel sections with respect to each other, in that the elongated central web (72) has a pair of spaced elongated longitudinal grooves extending along the exterior side surface and in that the hinge assembly further comprises two elongated retainer slats (90, 95) each having first and second elongated edges (91, 96, 97) the first elongated edges (91, 96) being adapted to be inserted into an elongated slot (41a, 61) of an abutting panel section (30, 50) in contact with the flange (73, 74) of the hinge (70) inserted therein and the second elongated edges (90, 97) being received by the longitudinal grooves (79, 80) along the exterior side of the elongated central web (72) for locking the elongated flexible hinge (70) in the elongated slots (41a, 61) of the abutting panel sections (30, 50).
2. Flexible hinge assembly according to Claim 1, characterised in that the flanges (73, 74) are formed of a material which is substantially resistant to flexure fatigue.
3. Flexible hinge assembly according to either Claim 1 or Claim 2, wherein the flanges (73, 74) are formed from a rigid thermoplastic material.
4. Flexible hinge assembly according to Claim 3, wherein the rigid thermoplastic material is

polyvinyl chloride or an acrylonitrile-butadiene-styrene polymer.

5. Flexible hinge assembly according to any preceding Claim, wherein the elongated central web (72) of the hinge (70) is formed from an elastomer.
6. Flexible hinge assembly according to Claim 5, wherein the elastomer is a polyester elastomer, a fluoro-elastomer or a thermoplastic rubber elastomer.
7. Flexible hinge assembly according to Claim 1 wherein the hinge (70) is formed of polypropylene or polyallomer.
8. Flexible hinge assembly according to any preceding Claim wherein the retainer slats (90, 95) are formed of thermoplastic polyvinyl chloride, acrylonitrile-butadiene-styrene polymer, polypropylene, polycarbonate or polyallomer.
9. Flexible hinge assembly according to any preceding Claim characterised in that the hinge (70) further comprises an outwardly extending anchoring flange (75, 76) facing away from the interior side surface of the central web (72) and being connected to the free end of each flange (73, 74) of the hinge (70) for further locking the hinge (70) in the elongated slots (41a, 61) of the panel sections upon the insertion of each flange (75, 76) thereinto.
10. Flexible hinge assembly according to any preceding Claim characterised in that each retainer slat (90) further comprises a third elongated edge (92) extending from the second elongated edge (91) of the retainer slat (90), each retainer slat (90) having first and second arms (91, 92) extending respectively between the first and second elongated edges and between the second and third elongated edges (91, 92), the arms (91, 92) being connected at an acute angle such that each retainer slat (90) has a generally V-shaped cross-section.
11. A hinged sectional door (10) comprising, at least two abutting panel sections (30, 50) secured together by a hinge assembly (70, 90, 95) according to any preceding claim.
12. A hinged sectional door comprising, at least two abutting panel sections (30, 50) secured together by a hinge assembly (70, 90) according to claim 10 characterised in that each panel section (30, 50) has an elongated groove (37a, 57) along the back side surface (45a, 65)

thereof in communication with the elongated slot (35a, 55) for receiving the second arm (92) of the retainer slats (90), the elongated groove (37a, 57) and slot (35a, 55) of each panel section (30, 50) forming a slot which is of generally V-shape cross-section for receiving one of the V-shape cross-sectioned retainer slats (90) such that the hinge (70) and the retainer slats (90), when inserted into the abutting panel sections (30, 50), are substantially flush with the back side surfaces (45a, 65) of the sections (30, 50).

13. A hinged sectional door according to Claim 11 or Claim 12 wherein the abutting longitudinal edge (31a) of one abutting panel section (30) has an elongated slot (34a) for receiving therein a corresponding elongated ridge (54) on the abutting longitudinal edge (51) of the other abutting panel section (50) so that, when the abutting panel sections (30, 50) are in an abutting relationship, the elongated ridge (54) mates with the elongated slot (34a).

Patentansprüche

1. Flexible Scharnieranordnung (70, 90, 95) zum Zusammenhalten zweier angrenzender Plattenabschnitte (30, 50) mit einem Scharnier (70) mit einem ersten und einem zweiten Armflansch (73, 74), von denen jede mit einem länglichen zentralen Steg (72) verbunden und vom jeweils anderen beabstandet ist, wobei ein Armflansch in einen in einem Plattenabschnitt (30) enthaltenen länglichen Schlitz einsteckbar ist und der andere Armflansch (74) in einen anderen länglichen Schlitz (36a, 56) in einem anderen angrenzenden Plattenabschnitt (50) einsteckbar ist, um die Plattenabschnitte (30, 50) in benachbarter Anordnung miteinander scharnierartig zu verbinden, wobei der zentrale längliche Steg (72) eine äußere Seite (78) mit einem länglichen Bereich (71) entlang dessen Mitte zum Biegen an diesem Bereich aufweist, dadurch gekennzeichnet, daß die flexible Scharnieranordnung (70, 90, 95) zum Zusammenhalten zweier Plattenabschnitte (30, 50) eines in gelenkig miteinander verbundenen Sektionen unterteilten Tores (10) zur gegenseitigen gelenkigen Verbindung der Plattenabschnitte dient, daß der längliche zentrale Steg (72) zwei beabstandete, sich entlang der Außenseitenoberfläche erstreckende längliche Nuten aufweist und daß die Scharnieranordnung weiterhin zwei längliche Halteleisten (90, 95) aufweist, wobei jede erste und zweite Leiste längliche Ränder (91, 96, 97) besitzt, wobei die ersten länglichen Ränder (91, 96) so ausge-

führt sind, daß sie in einen länglichen Schlitz (41a, 61) eines angrenzenden Plattenabschnitts (30, 50) in Kontakt mit dem Flansch (73, 74) des darin eingesteckten Scharniers (70) eingesteckt werden können und die zweiten länglichen Ränder (90, 97) von den Nuten (79, 80) entlang der Außenseite des länglichen Zentralstegs (72) aufgenommen werden, um das längliche flexible Scharnier (70) in den länglichen Schlitz (41a, 61) der angrenzenden Plattenabschnitte (30, 50) zu sichern.

2. Flexible Scharnieranordnung nach Anspruch 1, dadurch gekennzeichnet, daß die Flansche (73, 74) aus einem im wesentlichen gegen Biegeermüdung resistenten Material gebildet sind.
3. Flexible Scharnieranordnung nach Anspruch 1 oder 2, bei dem die Flansche (73, 74) aus einem steifen thermoplastischen Material gebildet sind.
4. Flexible Scharnieranordnung nach Anspruch 3, bei der das steife thermoplastische Material Polyvinylchlorid oder ein Acrylonitril-Butadienstyren-Polymer ist.
5. Flexible Scharnieranordnung nach einem der vorhergehenden Ansprüche, bei der der längliche Zentralsteg (72) des Flansches (70) aus einem Elastomer gebildet ist.
6. Flexible Scharnieranordnung nach Anspruch 5, bei der das Elastomer ein Polyester-Elastomer, ein Fluor-Elastomer oder ein thermoplastisches Gummi-Elastomer ist.
7. Flexible Scharnieranordnung nach Anspruch 1, bei der der Flansch (70) aus Polypropylen oder Polyallomer gebildet ist.
8. Flexible Scharnieranordnung nach einem der vorhergehenden Ansprüche, bei der die Halteleisten (90, 95) aus thermoplastischem Polyvinylchlorid, Acrylonitril-Butadienstyren-Polymer, Polypropylen, Polycarbonat oder Polyallomer gebildet sind.
9. Flexible Scharnieranordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Flansch (70) weiterhin einen sich nach außen erstreckenden, der Innenoberfläche des Zentralstegs (72) abgewandten und mit dem freien Ende jedes Flansches (73, 74) des Scharniers (70) zur weiteren Sicherung des Scharniers (70) in den länglichen Schlitz (41a, 61) der Plattenabschnitte bei Einsetzen jedes Flansches (75, 76)

darin verbundenen Ankerflansch (75, 76) enthält.

10. Flexible Scharnieranordnung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß jede Halteleiste (90) weiterhin einen dritten länglichen Rand (92) aufweist, welcher sich vom zweiten länglichen Rand (91) der Halteleiste (90) erstreckt, wobei jede Halteleiste (90) erste und zweite sich zwischen den ersten und zweiten länglichen Rändern respektive zwischen den ersten und dritten länglichen Rändern (91, 92) erstreckende Arme (91, 92) aufweist, wobei die Arme (91, 92) in einem spitzen Winkel miteinander verbunden sind, so daß jede Halteleiste (90) einen im wesentlichen V-förmigen Querschnitt aufweist.

11. In gelenkig miteinander verbundenen Sektionen unterteiltes Tor (10) mit mindestens zwei angrenzenden, durch eine Scharnieranordnung (70, 90, 95) entsprechend einem der vorhergehenden Ansprüche zusammengehaltenen Plattenabschnitten (30, 50).

12. In gelenkig miteinander verbundenen Sektionen unterteiltes Tor mit mindestens zwei durch eine Scharnieranordnung (70, 90) nach Anspruch 10 zusammengehaltenen Plattenabschnitten (30, 50), dadurch gekennzeichnet, daß jeder Plattenabschnitt (30, 50) eine längliche, mit dem länglichen Schlitz (35a, 55) zur Aufnahme des zweiten Arms (92) der Halteleisten (90) zusammenwirkende Nut (37a, 57) entlang der Rückseitenoberfläche (45a, 65) aufweist, und die längliche Nut (37a, 57) und der Schlitz (35a, 55) jedes Plattenabschnittes (30, 50) einen im Querschnitt im wesentlichen V-förmigen Schlitz bilden, um eine der im Querschnitt V-förmigen Halteleisten (90) aufzunehmen, so daß der Flansch (70) und die Halteleisten (90) im wesentlichen mit den Rückseitenoberflächen (45a, 65) jedes der Abschnitte (30, 50) fluchten, wenn sie in die angrenzenden Plattenabschnitte (30, 50) eingesteckt sind.

13. In gelenkig miteinander verbundenen Sektionen unterteiltes Tor nach Anspruch 11 oder 12, bei dem der angrenzende längliche Rand (31a) eines angrenzenden Plattenabschnittes (30) einen länglichen Schlitz (34a) aufweist, um darin einen entsprechenden Steg (54) des angrenzenden länglichen Randes (51) des anderen angrenzenden Plattenabschnittes (50) aufzunehmen, so daß, wenn die angrenzenden Plattenabschnitte (30, 50) in angrenzender Anord-

nung zueinander stehen, der längliche Steg (54) mit dem länglichen Schlitz (34a) zusammenpaßt.

5 Revendications

1. Montage de charnière flexible (70, 90, 95) pour relier deux segments de panneaux jointifs (30, 50) comprenant une charnière (70) ayant un premier et un second volets (73, 74), chacun étant relié à une âme centrale allongée (72) et écartés l'un de l'autre, un volet (73) pouvant être inséré dans une fente allongée (35a, 55) prévue dans un segment de panneau (30) et l'autre volet (74) pouvant être inséré dans une autre fente allongée (36a, 56) dans un autre segment de panneau jointif (50) pour relier d'une façon articulée les segments de panneaux (30, 50) dans une position relative jointive, l'âme centrale allongée (72) ayant un côté extérieur (78) avec une zone allongée (71) le long du milieu de celle-ci pour fléchir à cet endroit, caractérisé en ce que le montage de charnière (70, 90, 95) sert à relier deux segments de panneaux (30, 50) d'une porte segmentée (10) pour l'articulation des segments de panneaux les uns par rapport aux autres ; en ce que l'âme centrale allongée (72) possède une paire de gorges longitudinales allongées espacées s'étendant le long de la surface de côté extérieur, et en ce que le montage de charnière comprend en outre deux lames de maintien allongées (90, 95) chacune ayant un premier et un second bord allongé (91, 96, 97) les premiers bords allongés (91, 96) étant adaptés pour être insérés dans une fente allongée (41a, 61) d'un segment de panneau jointif (30, 50) en contact avec le volet (73, 74) de la charnière (70) inséré dans celle-ci et les seconds bords (90, 97) étant logés par les gorges longitudinales (79, 80) le long du côté extérieur de l'âme centrale allongée (72) pour verrouiller la charnière flexible allongée (70) dans les fentes allongées (41a, 61) des segments de panneaux jointifs (30, 50).

2. Montage de charnière flexible selon la revendication 1, caractérisé en ce que les volets (73, 74) sont formés à partir d'une matière qui est essentiellement résistante à la fatigue de flexion.

3. Montage de charnière flexible selon soit la revendication 1 soit la revendication 2, dans lequel les volets (73, 74) sont formés à partir d'une matière thermoplastique rigide.

4. Montage de charnière flexible selon la revendication 3, dans lequel la matière thermoplastique rigide est un chlorure de polyvinyle ou un polymère acrylonitrile-butadiène-styrène.

5. Montage de charnière flexible selon l'une quelconque des revendications précédentes, dans lequel l'âme centrale allongée (72) de la charnière (70) est formée à partir d'un élastomère.

6. Montage de charnière flexible selon la revendication 5, dans lequel l'élastomère est un élastomère de polyester, un élastomère fluoré ou un élastomère de caoutchouc thermoplastique.

7. Montage de charnière flexible selon la revendication 1, dans lequel la charnière (70) est formée à partir de polypropylène ou de polyallomère.

8. Montage de charnière flexible selon l'une quelconque des revendications précédentes, dans lequel les lames de maintien (90, 95) sont formées à partir d'un chlorure de polyvinyle, d'un polymère acrylonitrile-butadiène-styrène, d'un polypropylène, d'un polycarbonate, ou d'un polyallomère.

9. Montage de charnière flexible selon l'une quelconque des revendications précédentes, caractérisé en ce que la charnière (70) comprend en outre des talons d'ancrage s'étendant vers l'extérieur (75, 76) en partant et en s'éloignant de la surface de côté intérieur de l'âme (72), et étant reliés aux extrémités libres de chaque volet (73, 74) de la charnière (70) pour verrouiller ultérieurement la charnière (70) dans les fentes allongées (41a, 61) des segments de panneaux lors de l'insertion de chaque talon (75, 76) dans celles-ci.

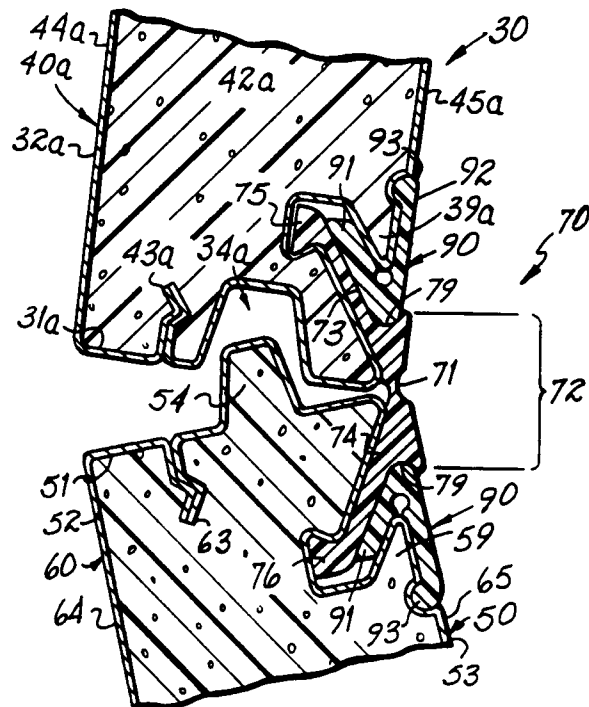
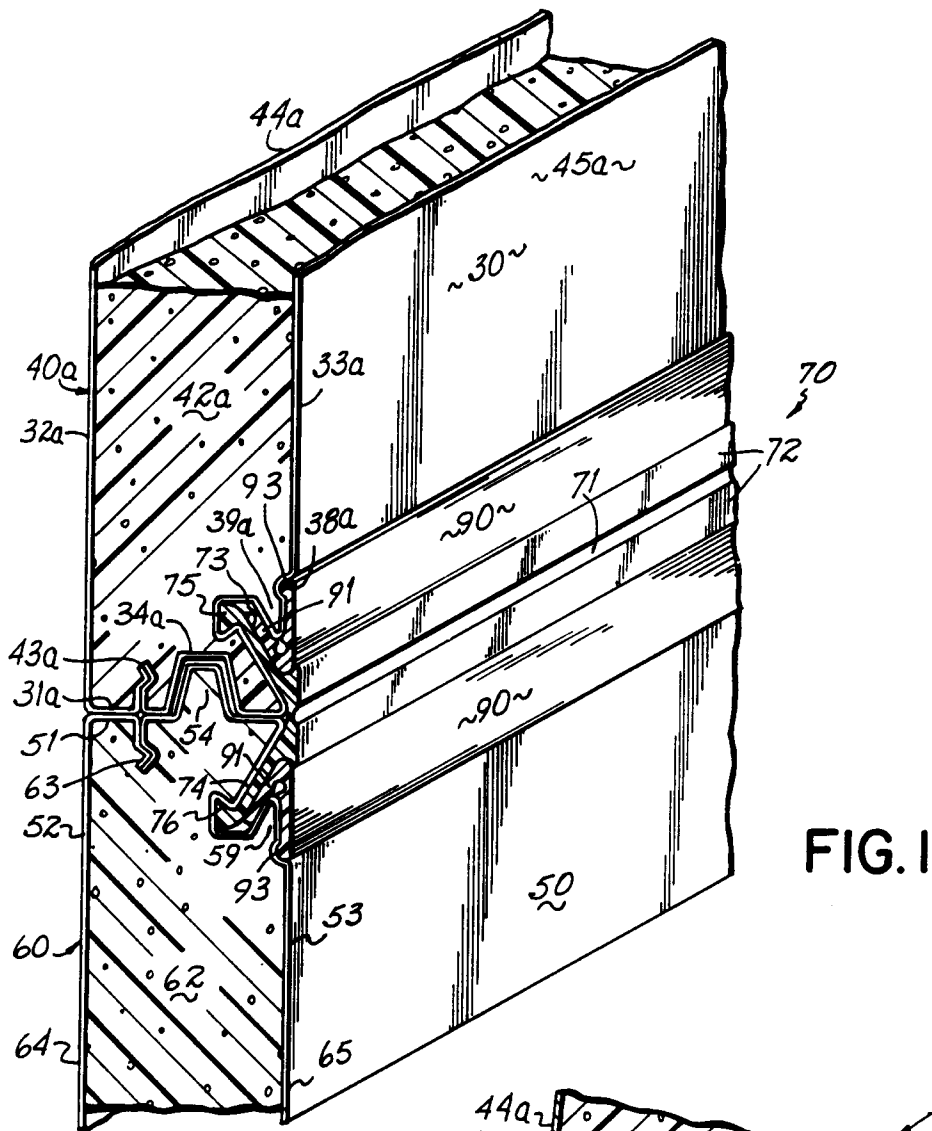
10. Montage de charnière flexible selon l'une quelconque des revendications précédentes, caractérisé en ce que chaque lame de maintien (90) comprend de plus un troisième bord allongé (92) s'étendant à partir du second bord allongé (91) de la lame de maintien (90), chaque lame de maintien (90) ayant un premier et un second bras (91, 92) s'étendant respectivement entre les premier et second bords allongés (91, 92), les bras (91, 92) étant reliés selon un angle aigu tel que chaque lame de maintien (90) ait une forme globalement en V en coupe transversale.

11. Porte segmentée articulée (10) comprenant, au moins deux segments de panneaux jointifs (30, 50) reliés par un montage de charnière (70, 90,

95) selon l'une quelconque des revendications précédentes.

12. Porte segmentée articulée comprenant, au moins deux segments de panneaux jointifs (30, 50) reliés par un montage de charnière (70, 90) selon la revendication 10, caractérisée en ce que chaque segment de panneau (30, 50) possède une gorge allongée (37a, 57) le long de la surface de côté arrière (45a, 65) de celle-ci en communication avec une fente allongée (35a, 55) pour recevoir le second bras (92) des lames de maintien (90), la gorge allongée (37a, 57) et la fente (35a, 55) de chaque segment de panneau (30, 50) formant une fente qui est, en coupe transversale, globalement en forme de V, pour recevoir une des lames de maintien en forme de V en coupe transversale (90), de telle façon que la charnière (70) et les lames de maintien (90), une fois insérées dans les segments de panneaux jointifs (30, 50), soient sensiblement affleurantes avec les faces du côté arrière (45a, 65) des segments (30, 50).

13. Porte segmentée articulée selon la revendication 11 ou la revendication 12, dans laquelle le bord longitudinal jointif (31a) d'un segment de panneau jointif (30) possède une fente allongée (34a) pour recevoir dans celle-ci une crête allongée correspondante (54) sur le bord longitudinal jointif (51) de l'autre segment de panneau jointif (50) de façon que, quand les segments de panneaux jointifs (30, 50) sont dans une position relative jointive, la crête allongée (54) s'emboîte dans la fente allongée (34a).



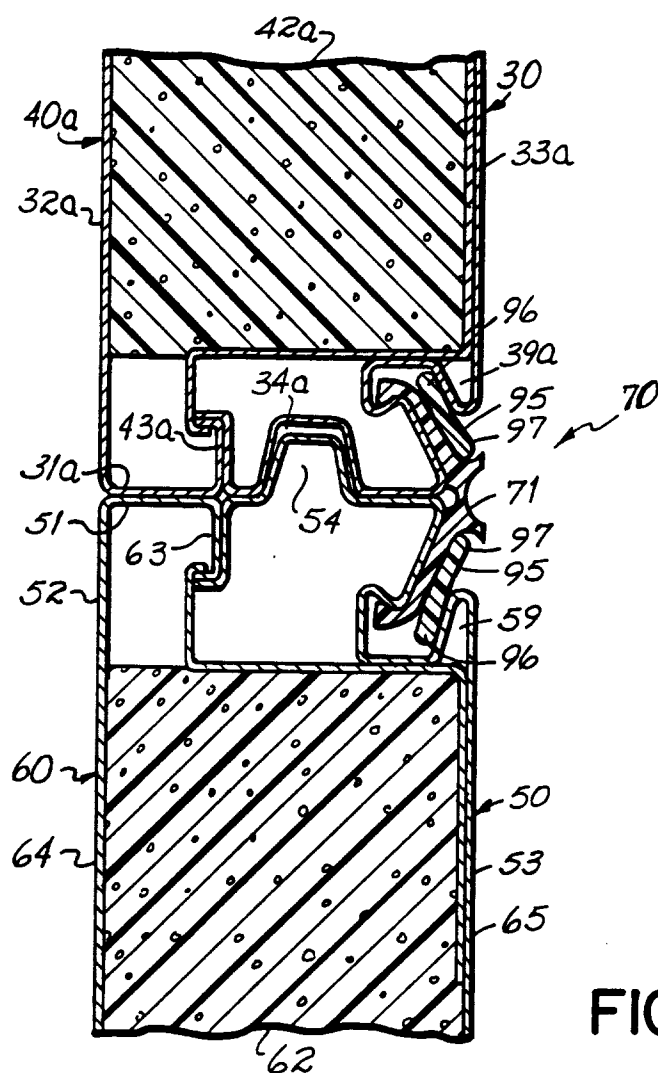


FIG. 3

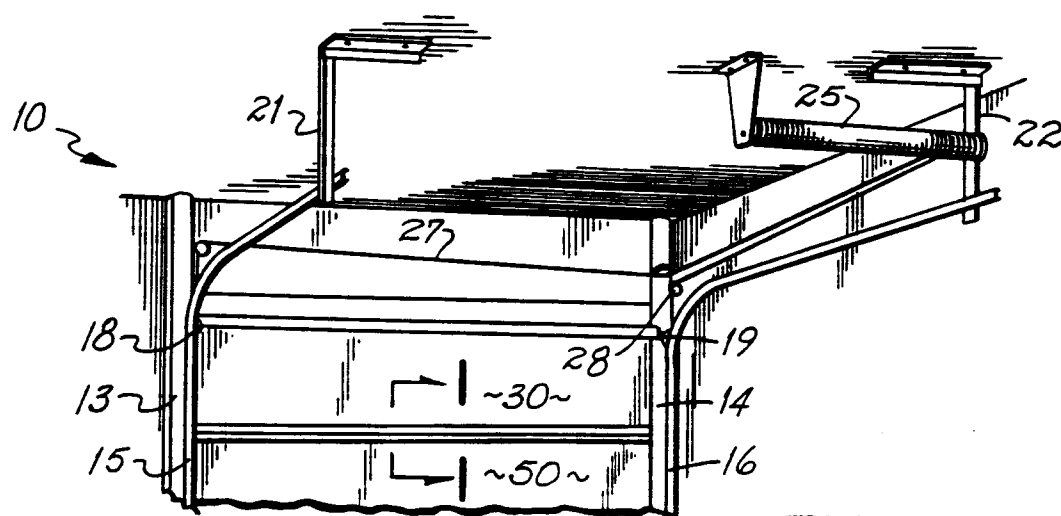


FIG. 4

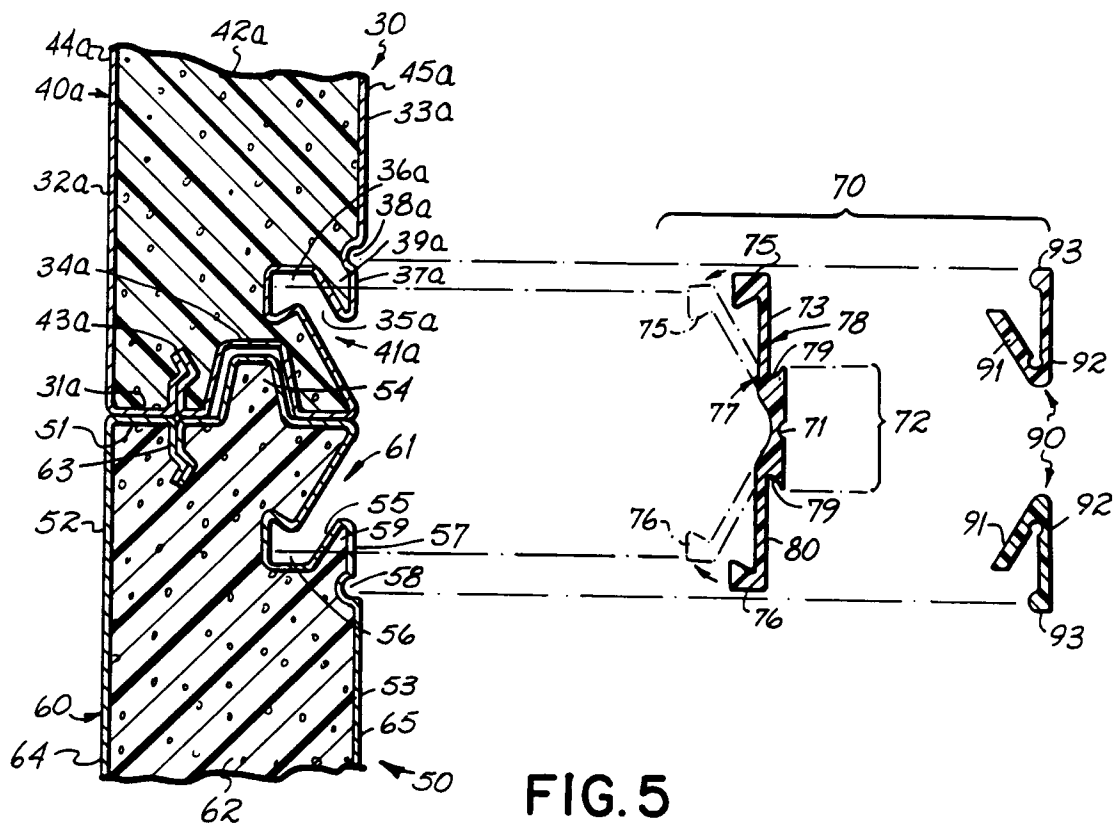


FIG. 5